

Prepared for
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DELAWARE VALLEY WORKS FACILITY SOUTH PARCEL, PHASE 2 30 PERCENT DESIGN REPORT

Delaware Valley Works Facility
Claymont, Delaware

Prepared by

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Project Number: JR0272

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1. INTRODUCTION

1.1 Overview and Objectives

This 30 Percent (%) Design Report was prepared by Geosyntec Consultants, Inc. (Geosyntec), on behalf of Drawbridge Claymont, LLC (Drawbridge) for the Delaware Valley Works (DVW) South Parcel, Phase 2 (the Site) located in Claymont, Delaware (RCRA ID No. DED154576698). The Phase 2 property is the subject of an Administrative Order on Consent (AOC) RCRA-03-2016-0232CA issued by the United States Environmental Protection Agency (USEPA) under the Resource Conservation and Recovery Act (RCRA). The 30% Design Report was prepared based on the information in the Pre-Design Investigation (PDI) Report [Geosyntec, 2020a] submitted to the U.S. Environmental Protection Agency (USEPA).

The 30% Design Report presents the conceptual design for the Selected Remedy detailed in the Statement of Basis [USEPA, 2016a] and the Final Decision and Response to Comments [USEPA, 2016b]. Site remediation and restoration is regulated by USEPA, in concert with the Delaware Department of Natural Resources and Environmental Control (DNREC).

1.2 Site Description and History

A description of the Site including the Site setting and land use, Site history, and previous Site characterization activities is presented in this section. The information presented herein was previously detailed in the *RFI Summary and Presumptive Remedy for Proposed Industrial Redevelopment Area* [Woodard & Curran, 2016], *Corrective Measures Implementation 100% Design Report Phase 1 of Remedy* [AECOM, 2017a through 2017e], and the *RCRA Corrective Measures Implementation 30% Design Report Phase 2* [Environmental Alliance, Inc., 2019].

1.2.1 Site Setting and Land Use

The DVW South Parcel Site is located along the Delaware – Pennsylvania border in an industrial area of New Castle County, Delaware, situated between Philadelphia Pike (Route 13) and the north shore of the Delaware River, approximately 0.2 miles west of the Pennsylvania State line. The Site and adjacent areas have been used for industrial purposes for more than 100 years. The Site location is shown on **Figure 1**.

Based on historical topographic maps from the United States Geologic Survey (USGS) from 1896 to 2016, the Site was undeveloped in the late 1800s and early 1900s. By 1941 the Site and adjacent properties were industrialized with several buildings and rail lines on Site. Historic photos show bulk storage tanks are visible at the adjacent property to the west, as are the piers that border the Delaware River to the south both on-Site and to the west. Bulk storage tank is currently present adjacent to the west property boundary. A wet area has been constructed to the east of the Site in the 1970s which appears to have been infilled and identified as a disposal site by 1993 and is mounded. The mound is visible in the 2016 topographic map. The 2011 to 2016 topographic maps illustrate a near-shore area that appears to be infilled sediments.

Historically, the Site comprised a chemical manufacturing facility straddling the Philadelphia Pike (Route 13). The North Plant facility is currently owned and operated by Honeywell International,

Inc. (Honeywell). The South Plant is an inactive (demolished) chemical manufacturing facility formerly operated by General Chemical which was acquired by Chemtrade Solutions LLC (Chemtrade) in 2014. The DVW South Plant (including Phase 1 and Phase 2) is the subject of an Initial Administrative Order issued to General Chemical LLC which formerly operated the South Plant [AECOM, 2017a].

The South Plant was subdivided in 2016 into a North Parcel and South Parcel. The South Parcel is 22 acres in size plus 5 acres of nearshore riparian zone. The South Parcel was further divided into two remedial and development units – Phase 1 is approximately 13 acres and has already been capped and redeveloped as a railcar storage yard, and Phase 2, approximately 9 acres, is the focus of this 30% Design Report (Site). Drawbridge purchased the South Parcel of the South Plant in August 2016 [USEPA, 2017b]. The Phase 2 parcel is bordered to the east by a sluiceway which conveys stormwater runoff from the North Parcel and North Plant. The sluiceway and the sediments in the riparian zone are to be addressed separately by Honeywell and Chemtrade. Currently all buildings have been demolished, however, some concrete slabs are present and other subsurface structures may also be present at the Site.

1.2.2 Site Investigation History

In 2000, an Initial Administrative Order issued for the DVW South Plant following a RCRA Facility Assessment in 1986. Since then, a number of investigations and reports related to the DVW South Plant have been prepared. They include, but are not limited to, the following:

- RFI Work Plan (2002)
- RFI Phase II Work Plan (2005)
- RFI Phase II Report (2007)
- USEPA Sediment Sampling (2008)
- Revised Work Plan (2010)
- Sediment, Soil, and Groundwater Data Submittal (2010)
- Interim Remedial Measure Alternatives Assessment, Upper Portion of Sluiceway (2012)
- Interim Remedial Measure Alternatives Assessment Closure Report (2013)
- RFI Summary and Presumptive Remedy for Proposed Industrial Redevelopment Area Final (Woodard & Curran, 2015 Final)
- Statement of Basis [USEPA, 2016]
- Final Decision [USEPA, 2016]
- RFI Summary and Presumptive Remedy for Proposed Industrial Redevelopment Area Final [Woodard & Curran, 2016 Revision 2]
- Corrective Measures Implementation Work Plan [AECOM, 2017]
- Geotechnical Report for Corrective Measures Implementation [AECOM, 2017]
- Corrective Measures Implementation (CMI) 100% Design Report for Phase 1 of the Remedy [AECOM, 2017]
- Corrective Measures Implementation 30% Cap Design Report for Phase 2 of the Remedy [Environmental Alliance, Inc., 2019]
- PDI Report, [Geosyntec Consultants, Inc., 2020]

The Corrective Measures Implementation (CMI) [Environmental Alliance, 2019] was submitted to USEPA however comments received required additional investigation to characterize the Site. A PDI was conducted by Geosyntec (outlined in Section 2) and forms the basis for the 30% design described herein.

Collectively, these investigations and reports indicate that the Site has been extensively investigated and characterized for environmental conditions and describe the area that is the subject of the Statement of Basis [USEPA, 2016]. Overall, the South Parcel contains ten solid waste management units (SWMU) and four Areas of Concern (AOC), of which the following six SWMUs and two AOCs are within the Phase 2 portion (the Site):

- SWMU 1 Former North Phosphoric Acid Pond;
- SWMU 2 South Phosphoric Acid Pond;
- SWMU 7 Effluent Clarifier;
- SWMU 26 South Waste Treatment Plant;
- SWMU 35 Former Hazardous Waste Storage Pad;
- AOC 2 Acid Spill Area; and
- AOC 14 Former Sulfuric Acid Storage Tank Area Sump.

Constituents of concern (COC) in soil at the Site include metals, notably arsenic and lead, and the polycyclic aromatic hydrocarbon benzo[a]pyrene at depths ranging from approximately 0 to 7 feet below ground surface (bgs). Historical results also indicate that there are metals in groundwater, and pesticides in soil and groundwater [Woodard & Curran, 2016].

1.3 **Remedy Description**

The selected remedy for the South Parcel is a combination of engineering and institutional controls outlined in the Statement of Basis [USEPA, 2016a] and the Final Decision and Response to Comments [USEPA, 2016b] and addresses the following Corrective Action Objectives (CAOs) for soil and groundwater:

Soil: *“Prevent all uncontrolled human exposure to contaminated soils that exceed the industrial RSLs and minimize cross-media transfer of contaminants of concern (COCs) from soil to groundwater and surface water to minimize the impact to ecological receptors.”* [USEPA, 2016a]

Groundwater: *“While this SB¹ does not include a proposed remedy for groundwater and because contaminants remain in the groundwater at the South Parcel, EPA is including a proposed corrective action objective for groundwater to prevent any other unacceptable exposures to impacted groundwater and ensure that groundwater containing elevated concentrations of COCs will not impact ecological receptors nor adjacent surface water bodies.”* [USEPA, 2016a]

¹ Statement of Basis

Groundwater is only being considered here as it relates to future controls to protect against unacceptable cross-media migration. Honeywell is legally responsible for groundwater at the South Plant.

As detailed in the USEPA Statement of Basis and Final Decision and Response to Comments, the selected remedy for the South Parcel is as follows:

The proposed remedy for the South Parcel soils is to install and maintain a low permeability cap that controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post remedial action escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere. In addition, the cap shall be designed and constructed to prevent infiltration to mitigate potential cross-media migration (soil to groundwater) of COCs. This cap shall be functionally equivalent to the performance standards documented in 40 CFR Section 265.310.” [USEPA, 2016a].

The South Parcel Phase 1 capping was constructed in 2017 and redeveloped as a railyard. The Phase 2 capping will integrate with the adjacent capping system beneath the railyard, as well as with the sluiceway, and the shoreline.

The proposed Phase 2 Capping System cross section includes the following components, from top to bottom:

- 12-inch thick drainage and protection layer;
- A minimum ¼-inch thick geosynthetic clay liner (GCL) layer; and
- Re-graded and compacted existing material.

The cap will be overlain by a cover layer that may consist of asphalt, gravel, concrete, vegetative cover, or other surface that will be selected to be consistent with the future use of the property. The basis for the cap design is discussed in Section 4, and **Appendix A** contains the 30% design drawings.

1.4 Design Report Organization

The remainder of this Design Report is organized as follows:

- Section 2 discusses the PDI.
- Section 3 describes the CAOs and design criteria for the remedy.
- Section 4 details the basis of design, major design assumptions, and design approach for the remedy.
- Section 5 presents the proposed design and construction schedule.
- Section 6 presents the document references.

2. PRE-DESIGN INVESTIGATION

A PDI was completed in 2020 in accordance with the PDI Workplan [Geosyntec, 2020b] approved by USEPA in February 2020. A PDI Report [Geosyntec, 2020a] summarizing methods and results of the PDI by remedy component was prepared by Geosyntec and submitted to the USEPA in November 2020. Comments were received on 13 January 2021 and a subsequent conference call was held on 10 February 2021. The PDI Report is summarized below and the information presented therein was used to develop the conceptual design presented in the remainder of this document. The PDI was conducted to supplement data collected in 2017 [AECOM, 2017a] as part of the Phase 1 capping.

2.1 Objectives of PDI

The objectives to the PDI were as follows:

- (1) Present supplemental data collected at the Site and an evaluation of the subsurface conditions, in particular subsurface permeability, to design a cap that is equal to or less permeable than the underlying materials;
- (2) Present geotechnical information that can be used for future Site redevelopment; and
- (3) Recommend an approach for the 30% design of a final remedy that meets the functional capping requirements of 40 CFR Section 265 (Landfills) Subsection 310 (Closure and Post-Closure Care) and is consistent with the anticipated future Site use.

2.2 Summary of PDI

Nine soil borings were advanced to depths ranging from 1.5 to 52 feet below ground surface (bgs). SPT values and lithology were recorded. Samples were collected using split-barrel samplers (via SPTs) and thin-walled tube samplers (i.e., Shelby tubes) for geotechnical laboratory testing. Samples collected represented both fine-grained soils of Strata 2 and 3, and coarser-grained soils of Strata 1 and 4.

The subsurface has six strata in descending order as follows:

- Stratum 1 (Fill) – brown, loose to very dense silty sand and gravel (upper), stiff sandy silty clay (lower), with brick, concrete, and wood.
- Stratum 2 – dark gray, soft to medium stiff silty clay and clayey silt, with organic materials.
- Stratum 3 – brown, stiff to very stiff sandy silty clay and clayey silt.
- Stratum 4 – brown and gray, medium dense to very dense silty sand and gravel.
- Stratum 5 (Residual Soil) – gray and light gray, dense to very dense silty sand, very stiff to hard sandy silt and silty clay, with relict rock structure.
- Stratum 6 (Decomposed Rock) – light gray and dark gray, very dense silty sand, hard sandy silty clay and clayey silt, with relict rock structure.

In general, the Stratum 1 fill increases in thickness from 4 to 20 feet thick towards the Delaware River. Stratum 2, soft clayey silt containing organic material, extends below the fill material to a thickness of 28 feet, and deeper than 37 feet where Stratum 3 is not present. Stratum 3 is discontinuous – it is present in the northwest portion of the Site but is largely absent from the remainder of the portion of the Site investigated in 2020. Boring B-20-20 was installed to a depth of 52 feet bgs extending into Stratum 4. Strata 5 and 6 were not encountered during the PDI.

2.3 Hydraulic Conductivity of Subsurface Soils

Hydraulic conductivities of coarse-grained strata 1 and 4 were not directly measured due to the difficulty in obtaining an undisturbed sample, and in-situ slug or infiltration testing is impractical due to the shallow nature of Stratum 1. Instead, hydraulic conductivities were estimated from sieve analysis results using the Kozeny-Carman formula as presented in Carrier [2003]. This semi-empirical, semi-theoretical formula for predicting the permeability of porous materials is based on the entire particle size distribution of the soil, the particle shape, and the void ratio.

Samples from Stratum 1 generally classified as silty sand and gravel fill. Estimated vertical hydraulic conductivities ranged from 1.6×10^{-6} centimeters per second (cm/s) to 2.9×10^{-4} cm/s with a geometric mean of 2.2×10^{-5} cm/s.

Samples from Stratum 4 generally classified as silty sand and gravel. Estimated vertical hydraulic conductivities ranged from 1.8×10^{-6} cm/s to 3.2×10^{-4} cm/s with a geometric mean of 2.2×10^{-5} cm/s.

Hydraulic conductivities of samples obtained from fine-grained strata (i.e., Stratum 2 and Stratum 3) were measured using flexible-wall triaxial permeability tests. Test specimens were generally consolidated to the mean effective stress they were originally subjected to in the field to evaluate the hydraulic conductivity of soils within the stress range of interest for the Site. Falling head hydraulic conditions were used for permeability tests.

Samples from Stratum 2 generally classified as silty clay and clayey silt with organic material. Vertical hydraulic conductivity results from permeability tests performed on samples from Stratum 2 ranged from 1.2×10^{-7} cm/s to 3.6×10^{-6} cm/s with a geometric mean of 4.7×10^{-7} cm/s.

One-dimensional incremental loading consolidation tests were also performed on samples obtained from Stratum 2. For consolidation tests where time-deformation measurements were recorded for each load increment, hydraulic conductivities were back-calculated based on the rate of consolidation. Vertical hydraulic conductivity results from consolidation tests performed on samples from Stratum 2 ranged from 3.2×10^{-8} cm/s to 1.3×10^{-7} cm/s with a geometric mean of 7.3×10^{-8} cm/s.

Samples from Stratum 3 generally classified as sandy silty clay and clayey silt. Vertical hydraulic conductivity results from one permeability test performed on a sample from Stratum 3 had a result of 4.2×10^{-7} cm/s.

2.4 Additional Geotechnical Properties

Compressibility parameters were developed by Geosyntec and included data collected data from the previous AECOM investigation [2017a]. Specific settlement estimation was not performed since the redevelopment loads have not been identified.

Specific future development at the Site beyond construction of the low permeability cap has not yet been determined but may include a combination of truck parking, warehouse, bulk storage, and pier access. Additional geotechnical data were collected in the PDI phase to assist with future Site development and to minimize the need for future geotechnical investigation borings (penetrations to the Site cap). The following geotechnical properties were developed as described in PDI Appendix C:

- Density properties
- Hydraulic conductivities
- Compressibility and elastic moduli
- Normalized SPT resistance values
- Drained and undrained shear strength parameters

It is anticipated that these properties may be useful for future geotechnical analyses such as: (i) bearing capacity and settlement analyses of shallow foundations; (ii) axial and lateral resistance of driven piles and drilled shafts; (iii) lateral earth pressures for buried structures and retaining walls; and (iv) seismic design parameters and liquefaction evaluations. Future site development beyond capping is still to be determined and therefore further geotechnical evaluation is beyond the scope of this 30% Design Report.

3. DESIGN CRITERIA

This section of the Design Report describes the technical parameters upon which the design for the remedy will be based.

3.1 Design Criteria for Capping System

A capping system is a containment technology that forms a barrier between the contamination source and the ground thus minimizing exposure of human and ecological receptors to COCs. It is also typically designed to limit or prevent surface water and rainwater infiltration below the barrier to reduce the potential for leaching of COC between subsurface media (soil to groundwater and discharge to surface water).

The performance standards documented in 40 CFR Section 265.310 are as follows:

1. Provide long-term minimization of migration of liquids through the closed landfill;
2. Function with minimum maintenance;
3. Promote drainage and minimize erosion or abrasion of the cover;
4. Accommodate settling and subsidence to maintain the integrity of the cover; and
5. Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

To meet those performance standards, design criteria for the capping system remedy include the following:

- A physical barrier layer with hydraulic conductivity less than or equal to the underlying subsurface material. For the Site, the underlying material that requires capping is Stratum 1, the fill layer, which ranges from 4 to 20 feet in thickness, and that contains the COC from surface to 7 feet bgs. The average permeability of the Stratum 1 fill layer is calculated to be 2.2×10^{-5} cm/s [Geosyntec, 2020b]. A properly installed GCL can achieve a hydraulic conductivity of 5×10^{-9} cm/sec. This hydraulic conductivity is significantly lower than the underlying soils.
- A minimum 12-inch thick drainage and protection layer that will promote drainage, minimize erosion or abrasion of GCL, and maintain the integrity of the cover.

In addition, a surface cover will be installed over the physical barrier layer before the Site is redeveloped. This surface cover may consist of either asphalt, gravel, concrete, vegetative cover material, or other surface that will be selected to be consistent with the future use of the property.

3.2 Operation and Maintenance

After construction is complete and the proposed remedy is installed at the Site, operation and maintenance of the remedial action systems will begin. Operation and maintenance for the capping system will include a combination of planned, routine action and nonroutine maintenance to address issues identified during the quarterly inspection.

The respondent or their contractor will perform routine quarterly inspections. All records (i.e., inspection reports and maintenance repair summaries) will be submitted to USEPA (specifically, electronically to USEPA Region 3) and DNREC Solid and Hazardous Waste Management Section (SHWMS) in annual progress reports. Any signs of erosion, settlement cracking, or other Site maintenance problems identified during inspections will be corrected as soon as possible. A Cap Management Plan (CMP) for Phase 2 capping is included in **Appendix B**. A Materials Management Plan (MMP) for Phase 2 is included in **Appendix C**.

4. BASIS OF DESIGN

This section presents the basis of design, significant design assumptions, and design approach for the capping system. Design drawings are included in **Appendix A**.

The basis of design for the final capping system is to meet the design criteria detailed in Section 3.3 by providing a physical barrier to the underlying waste and minimizing exposure of human and ecological receptors to COCs. The proposed cap system consists of geosynthetic components designed to meet USEPA RCRA and DNREC requirements and to protect the environment. A properly installed GCL can achieve a hydraulic conductivity of 5×10^{-9} cm/sec. This hydraulic conductivity is significantly lower than the underlying soils, which have a permeability ranging between 1×10^{-6} cm/sec and 2.9×10^{-4} cm/sec in Stratum 1, and 1.2×10^{-7} cm/sec and 3.6×10^{-6} cm/sec in Stratum 2 (Geosyntec, 2020a).

To minimize the fill imported to the Site, the grades will be designed to balance the cut/fill volumes of the Site, minimize the amount of grading and shaping, avoid engineered stormwater controls (e.g., channels, outlet structures) and reduce materials that must be imported from off-site borrow sources.

4.1 Design Assumptions

Preliminary design of the final capping system for Phase 2 has been performed under the following assumptions:

- Wetlands are not present on the Site.
- The majority of the limit of work is located within the Federal Emergency Management Agency (FEMA) Base Flood Elevation Zone X. An approximate 2.2-acre area to the south is located within Base Flood Elevation Zone VE.
- The Site will be used as pier access, truck parking, warehouse facilities, and/or bulk storage. Construction in Phase 2 will likely require future cap penetrations for storage building footings and light standards.

4.2 Design Approach

The South Parcel Phase 2 remedy includes construction of a low permeability cap with geosynthetic components. This cap will minimize infiltration of rainwater through the impacted soil.

Based on the required cover permeability and the need for simplicity in Site development, a GCL-based cap is recommended as the proposed cover system for the Site. The COC are predominantly in the fill material and thus capping the Site with a GCL-based system and when graded with a minimum slope of 1%, will satisfy the functional capping requirements of 40 CFR 265.310 and meet or exceed the permeability requirements of the underlying fill layer (Stratum 1).

The proposed cap system cross-section consists of the following components, from top to bottom:

- Minimum 12-inch drainage and protection layer;
- A minimum ¼-inch GCL; and
- Re-graded and compacted existing fill material.

A cross-section of the proposed cover system is depicted in **Sheet 4 (Appendix A)**. The cap will be overlain by a cover layer that may consist of asphalt, gravel, concrete, vegetative cover, or other surface that will be selected to be consistent with the future use of the property.

The proposed cover system was selected as the preferred remedial approach because it will effectively and consistently minimize long-term risks to human and ecological receptors, minimize infiltration of precipitation and runoff, allow for Site redevelopment use as a truck parking area, warehouse, and/or bulk storage, and provide access to the adjacent pier in the most cost-effective manner. In addition, the proposed cover system is durable (i.e., it resists rutting and lateral distortion) and a properly prepared subgrade will reduce differential settlement which will further reduce overall settlement. This cap design meets the functional capping requirements of 40 CFR 265.310.

The proposed cover system will support future Site development. One of the key design factors in choosing the selected remedy is the requirement that the permeability be less than or equal to that of the underlying soils. A detailed PDI was implemented to better characterize the subsurface strata, and is discussed in Section 2. Additional remediation elements to be addressed in the cap design include:

- Final grades of minimum of 1 % to ensure efficient drainage off the capped area, reduce ponding, and reduce infiltration;
- Detailed drawings illustrating the “tie-ins” at Site boundaries with the Phase 1 cap, and with the sluiceway and shoreline, to ensure consistent cap performance across the Site; and
- A quarterly inspection and repair program to identify cracks or other issues in the capped area, and repairs to maintain the design permeability of the caps.

The proposed final grading for the management areas are shown on **Sheet 3 (Appendix A)**. Elevations illustrated in the grading plans are based on the most recent topographic mapping. Final sideslope grades shall be no steeper than 3 horizontal to 1 vertical (3H:1V).

5. REMEDIAL ACTION SCHEDULE

A schedule for 30%, 90%, and 100% design deliverables and construction implementation is included in **Appendix D**.

6. REFERENCES

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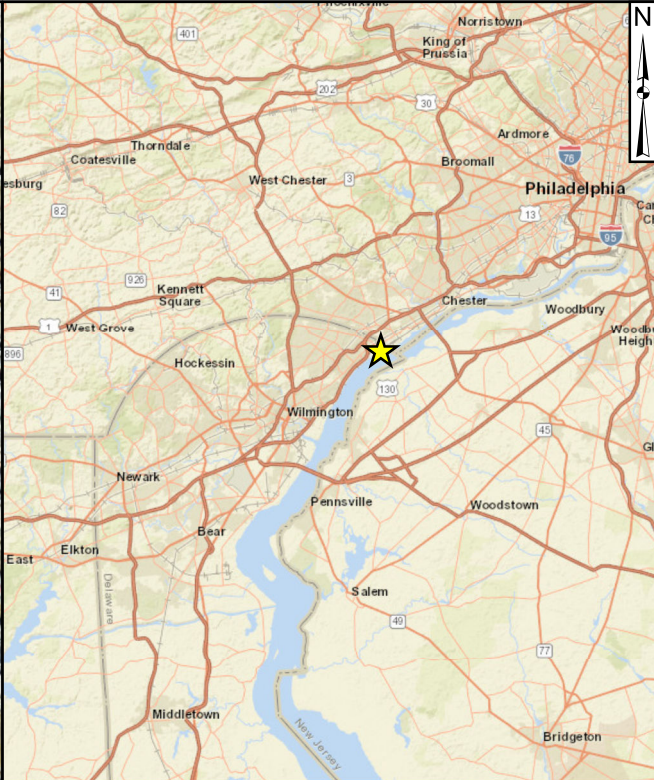
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FIGURES



- Legend**
- Facility Boundary**
- South Plant North Parcel
 - South Plant South Parcel - Phase 1
 - South Plant South Parcel - Phase 2 (Project Site)

0 500 Feet

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Site Location Map

Drawbridge Claymont, LLC
Delaware Valley Works Facility, South Plant
Claymont, Delaware

Geosyntec
consultants

Pennington, New Jersey

July 2021

Figure

1

APPENDIX A

30 PERCENT DESIGN DRAWINGS

30 Percent Design

South Parcel Remedial Action Phase 2

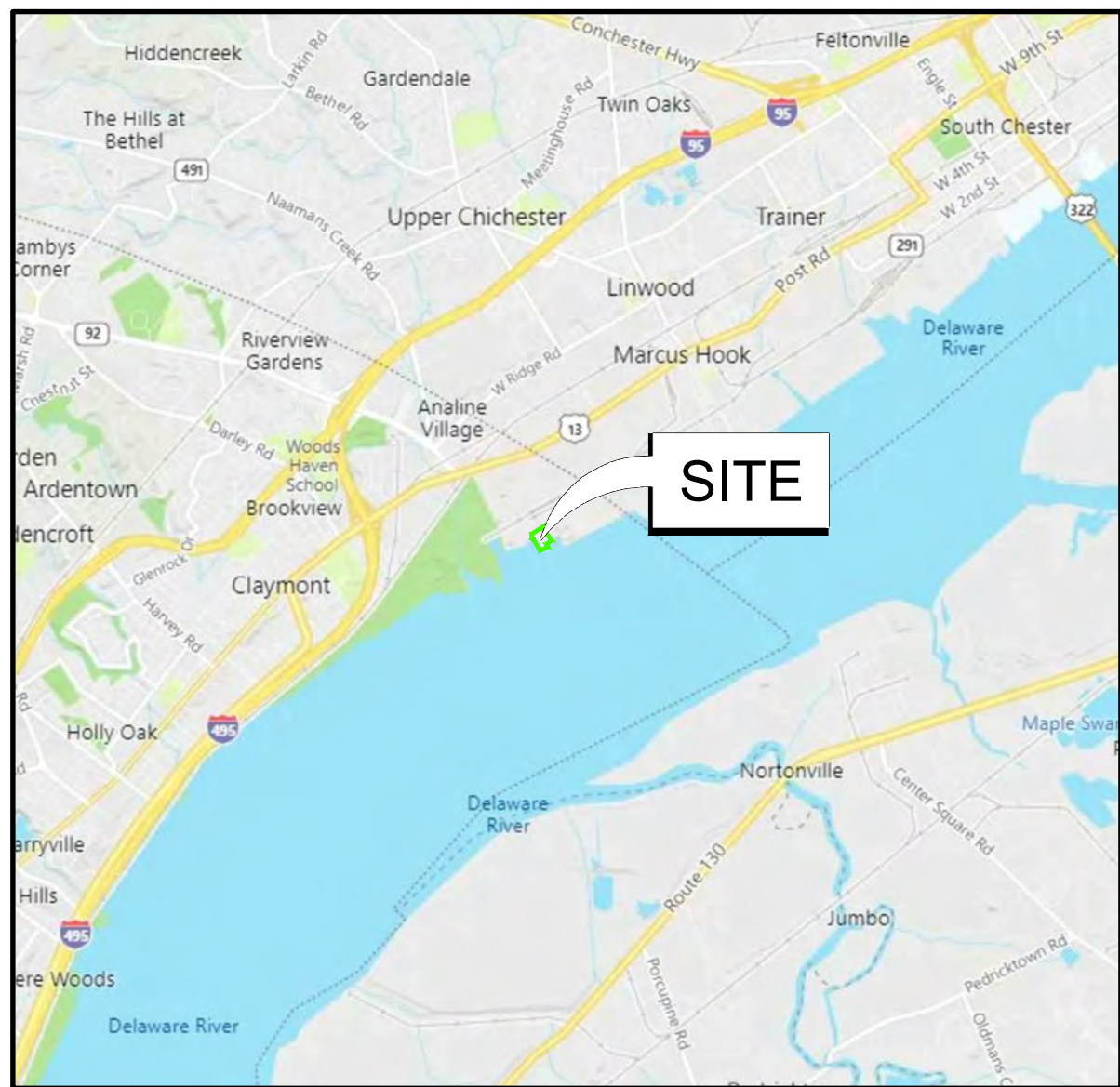
Delaware Valley Works Facility, South Plant

Claymont Delaware

RCRA ID No.: DED154576698

PROJECT NO. JR0272

July 2021



SOURCE: **VICINITY MAP**
SCALE: 1" = 1 MILE

LIST OF DRAWINGS	
SHEET NUMBER	SHEET TITLE
1	COVER SHEET
2	EXISTING CONDITIONS
3	DEVELOPMENT PLAN
4	DETAILS



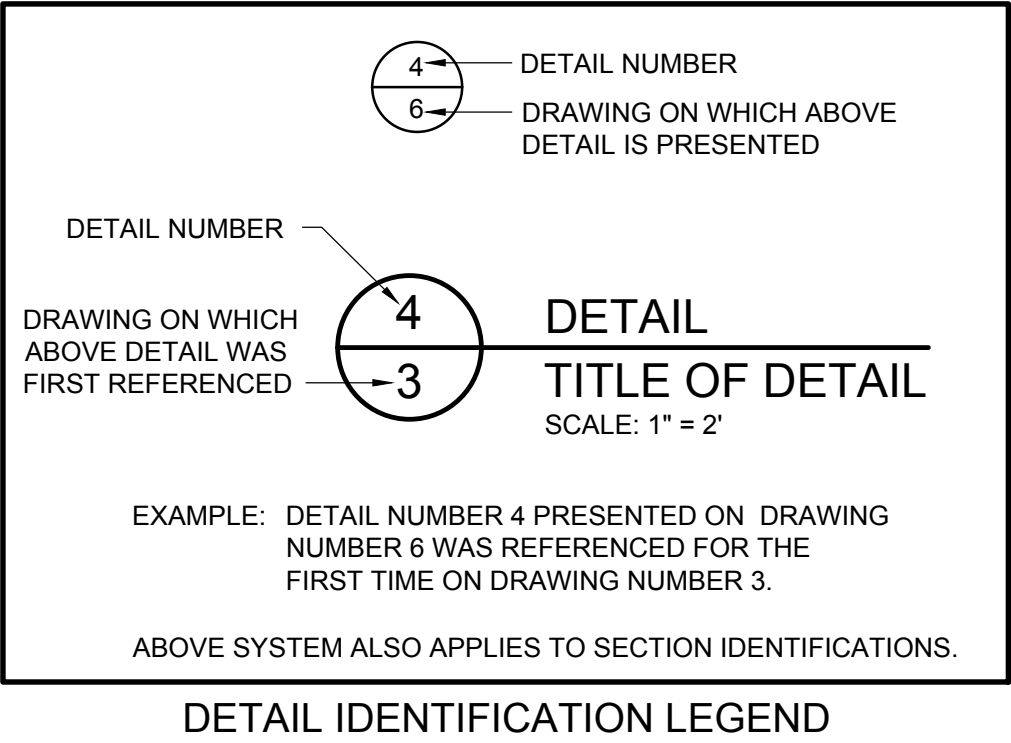
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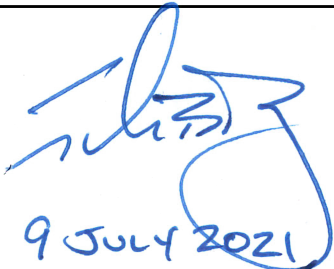
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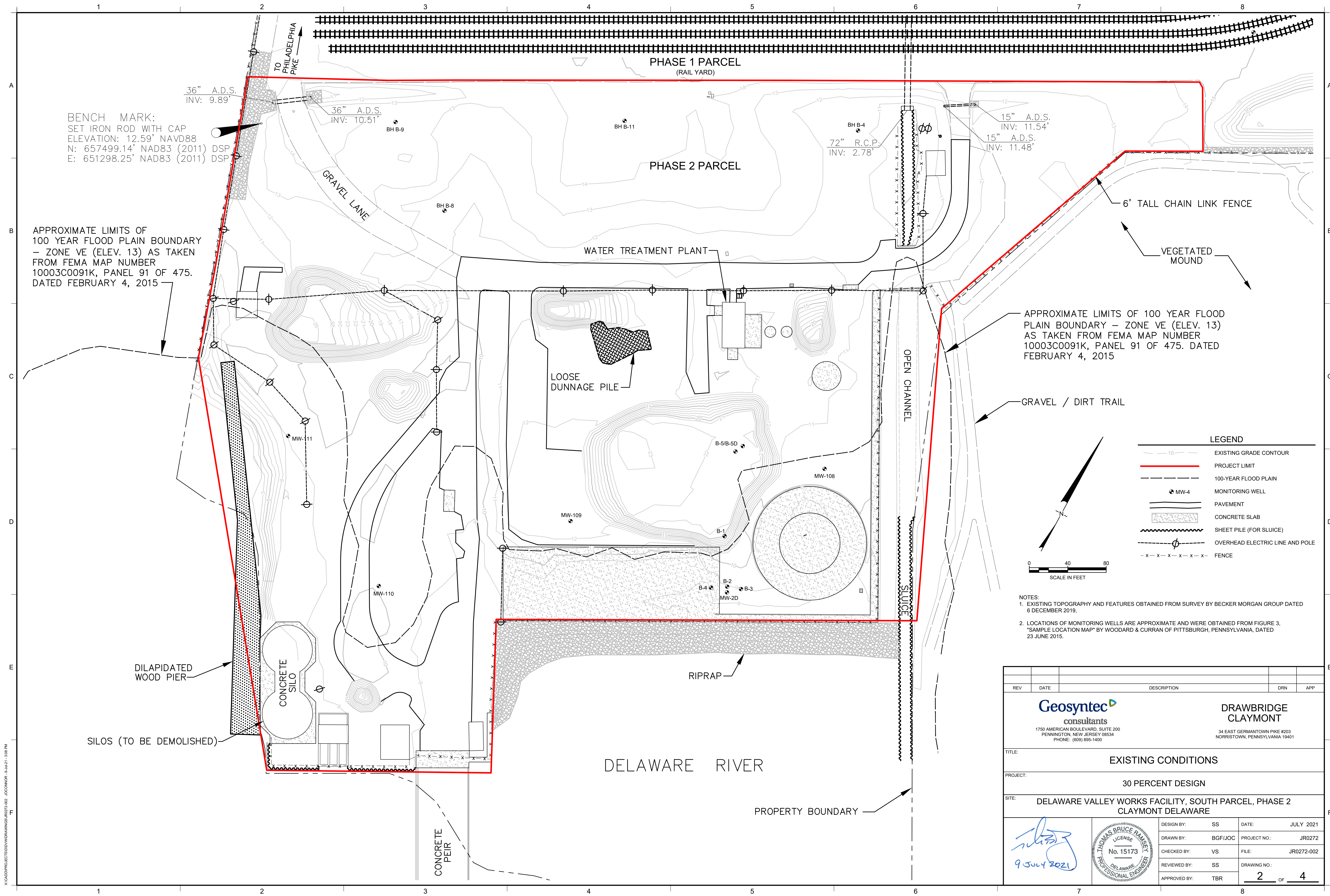
DRAWBRIDGE CLAYMONT
34 EAST GERMANTOWN PIKE #203
NORRISTOWN, PENNSYLVANIA 19401

PREPARED BY:

1750 AMERICAN BOULEVARD, SUITE 200
PENNINGTON, NEW JERSEY 08534
PHONE: (609) 895-1400



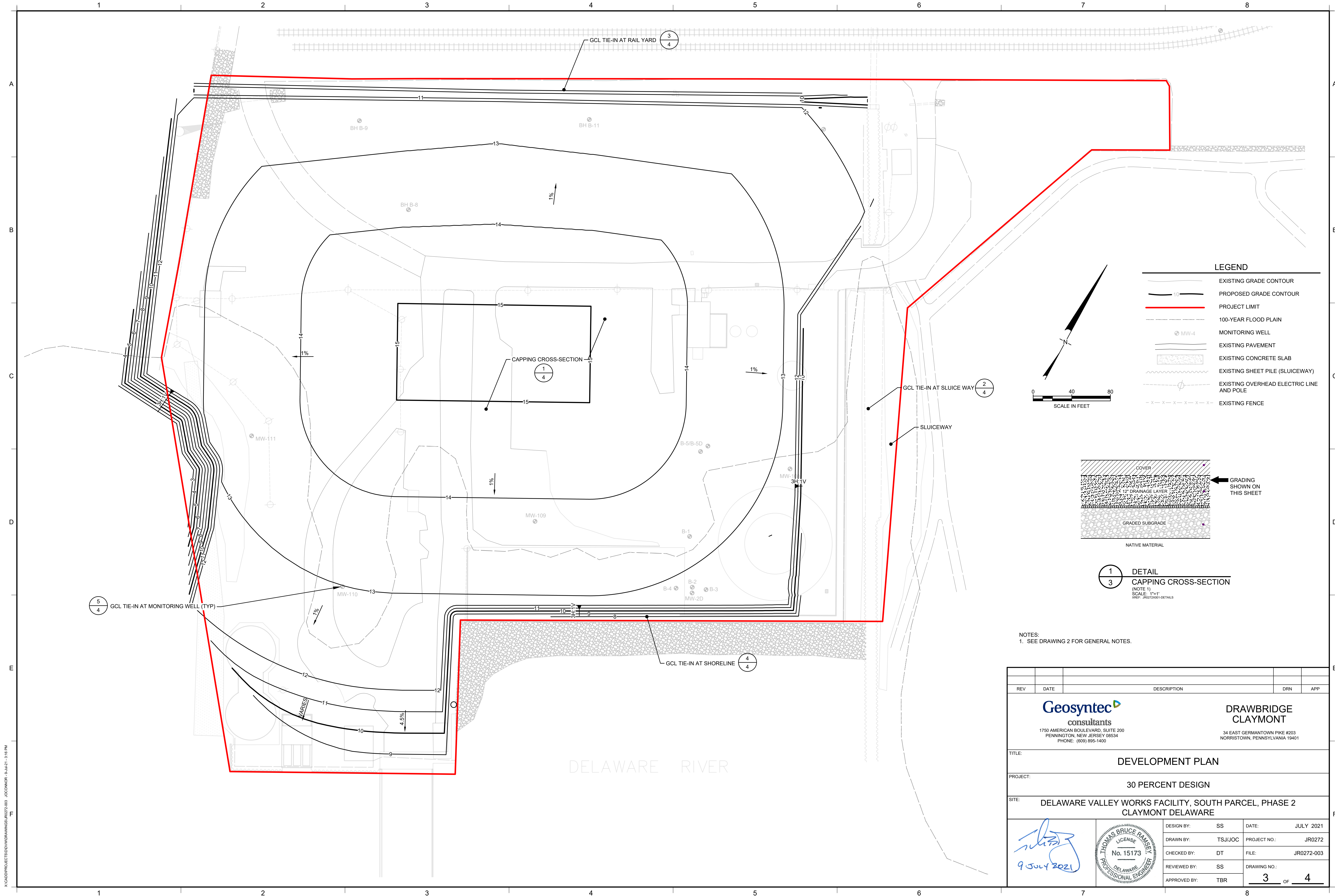
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TITLE:					
COVER SHEET					
PROJECT:					
30 PERCENT DESIGN					
SITE:					
DELAWARE VALLEY WORKS FACILITY, SOUTH PARCEL, PHASE 2 CLAYMONT DELAWARE					
<div><div><div>9 JULY 2021</div></div></div>		<div><div><div>THOMAS BRUCE RAMSEY</div><div>LICENSE</div><div>No. 15173</div><div>DELAWARE</div><div>PROFESSIONAL ENGINEER</div></div></div>		DESIGN BY: SS	DATE: JULY 2021
				DRAWN BY: BGF/JOC	PROJECT NO.: JR0272
				CHECKED BY: DT	FILE: JR0272-001
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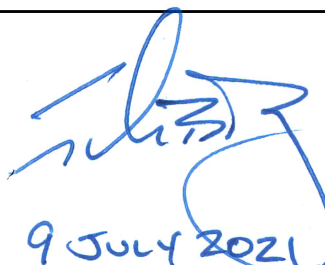
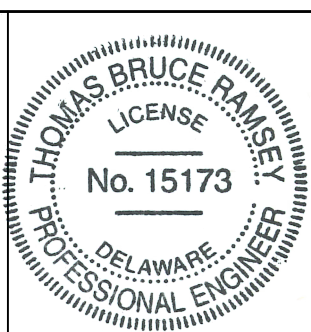


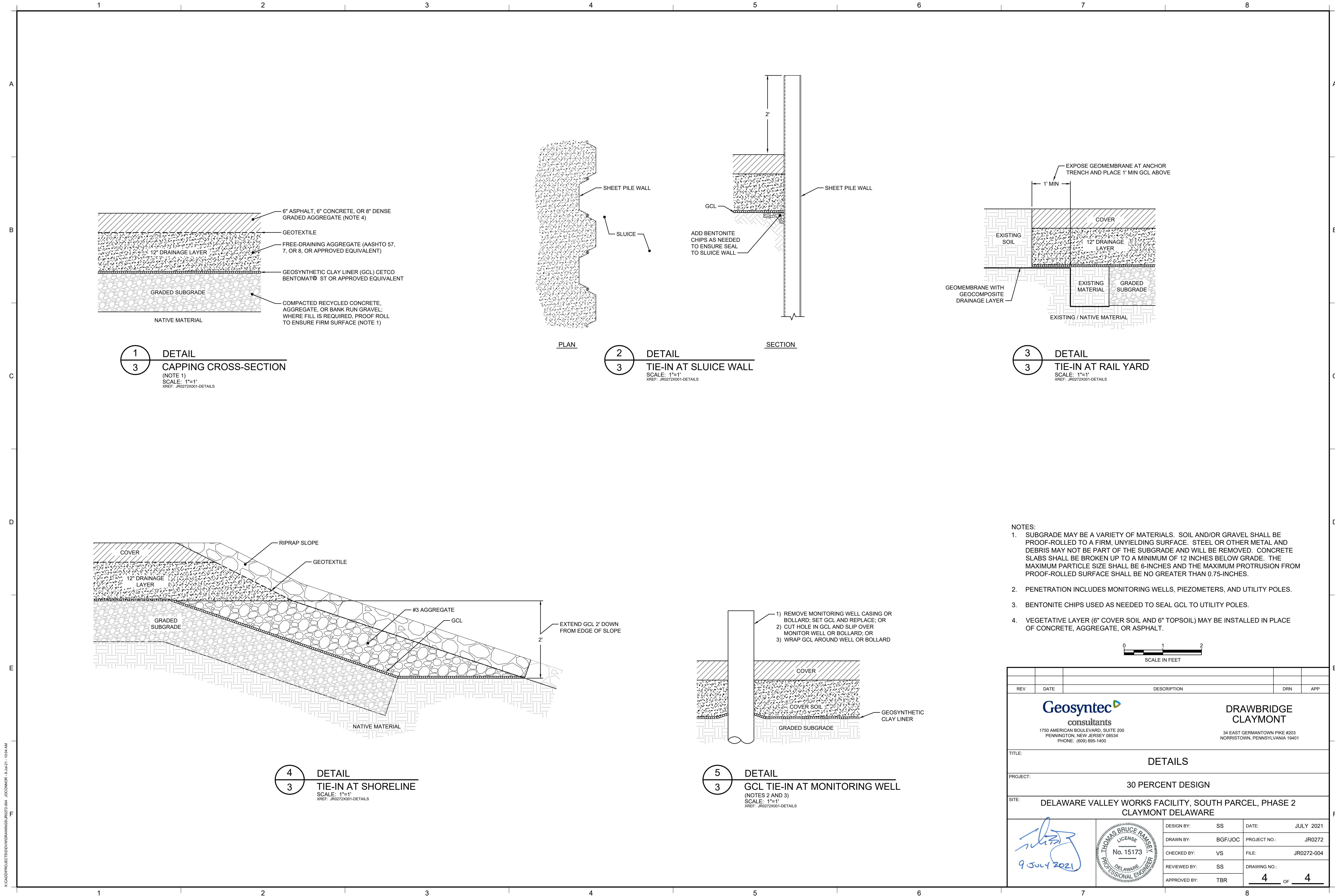
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2. LOCATIONS OF MONITORING WELLS ARE APPROXIMATE AND WERE OBTAINED FROM FIGURE 3, "SAMPLE LOCATION MAP" BY WOODARD & CURRAN OF PITTSBURGH, PENNSYLVANIA, DATED 23 JUNE 2015.

REV	DATE	DESCRIPTION	DRN	APP
<div><div><div>Geosyntec</div><div>consultants</div><div>1750 AMERICAN BOULEVARD, SUITE 200 PENNINGTON, NEW JERSEY 08534 PHONE: (609) 895-1400</div></div><div><div>DRAWBRIDGE</div><div>CLAYMONT</div><div>34 EAST GERMANTOWN PIKE #203 NORRISTOWN, PENNSYLVANIA 19401</div></div></div>				
TITLE: EXISTING CONDITIONS				
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APPROVED BY:	TBR			

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PROJECT: <div>30 PERCENT DESIGN</div>																														
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APPENDIX B

CAP MANAGEMENT PLAN

Prepared for
Drawbridge Claymont, LLC

34 East Germantown Pike #203
Norristown, Pennsylvania 19401

DELAWARE VALLEY WORKS FACILITY SOUTH PARCEL, PHASE 2 CAP MANAGEMENT PLAN

Delaware Valley Works Facility
Claymont, Delaware

Prepared by

Geosyntec 
consultants

engineers | scientists | innovators

1750 American Boulevard, Suite 200
Pennington, New Jersey 08534

Project Number: JR0272

July 2021

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Table 1	Capping System Post-Closure Site Inspection Checklist
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FIGURES

Figure 1	Site Location Map
Figure 2	Site Plan

1. SCOPE AND PURPOSE OF PLAN

1.1 General

This Cap Management Plan (CMP) was developed for implementation as part of the remedial design plan for the South Parcel Phase 2 (Site) of the Delaware Valley Works (DVW) South Plant. The procedures used to develop this CMP are consistent with Delaware Operation and Maintenance Guidance Document for Hazardous Substance Cleanup Act (HSCA) and Voluntary Cleanup Plan (VCP) sites (DNREC, 2002). The procedures are consistent with the requirements of the Resource Conservation and Recovery Act (RCRA) and other requirements of the United States Environmental Protection Agency (USEPA).

This CMP is based on the CMP developed for the South Plant, South Parcel, Phase 1 cap by AECOM (2017) and has been modified to reflect the Phase 2 capping remedy.

The CMP provides a discussion of the necessary Site monitoring, routine maintenance, personnel, record keeping, and reporting associated with a capping post-closure care period. This CMP may be revised with agency approval to reflect repairs and changes in procedures.

The components of the Phase 2 remedial design described in Section 3.0 that will require a regular long-term maintenance program are the cap system and surface-water control system. Regular Site inspections and routine (scheduled) maintenance are described in Section 4.0.

1.2 Organization and Responsibilities

Drawbridge Claymont LLC (Drawbridge) is the Site owner and has overall responsibility for implementation of the corrective measures. Chemtrade Solutions LLC (Chemtrade) is the former owner and is assisting Drawbridge in the Site operations and maintenance. Key personnel, their roles and responsibilities, and the contact information are listed in the following table.

Key Personnel	Organization and Title	Contact Information
Paul Falcone	Drawbridge Site Manager	610.564.6330 pfalcone@d2organization.com
Brian Finnegan	Drawbridge Vice-President and Project Manager	484.322.5440 bfinnegan@d2organization.com

2 SITE DESCRIPTION AND HISTORY

2.1 Site Location and History

The DVW South Parcel Site is located along the Delaware – Pennsylvania border in an industrial area of New Castle County, Delaware, situated between Philadelphia Pike (Route 13) and the north shore of the Delaware River, approximately 0.2 miles west of the Pennsylvania State line. The Site and adjacent areas have been used for industrial purposes for more than 100 years. The Site location is shown on **Figure 1**.

Based on historical topographic maps from the United States Geologic Survey (USGS) from 1896 to 2016, the Site was undeveloped in the late 1800s and early 1900s. By 1941 the Site and adjacent properties were industrialized with several buildings and rail lines on Site. Historic photos show bulk storage tanks are visible at the adjacent property to the west, as are the piers that border the Delaware River to the south both on-Site and to the west. Bulk storage tank is currently present adjacent to the west property boundary. A wet area has been constructed to the east of the Site to in the 1970s which appears to have been infilled and identified as a disposal site by 1993 and is mounded. The mound is visible in the 2016 topographic map. The 2011 to 2016 topographic maps illustrate a near-shore area that appears to be infilled sediments.

Historically, the Site comprised a chemical manufacturing facility straddling the Philadelphia Pike (Route 13). The North Plant facility is currently owned and operated by Honeywell. The South Plant is an inactive (demolished) chemical manufacturing facility formerly operated by General Chemical LLC which was acquired by Chemtrade in 2014. The DVW South Plant (including Phase 1 and Phase 2) is the subject of an Initial Administrative Order issued to General Chemical LLC which formerly operated the South Plant [AECOM, 2017a].

The South Plant was subdivided in 2016 into a North Parcel and South Parcel. The South Parcel is 22 acres in size plus 5 acres of nearshore riparian zone. The South Parcel was further divided into two remedial and development units – Phase 1 is approximately 13 acres and has already been capped and developed as a railcar storage yard, and Phase 2, approximately 9 acres, is the focus of this 30% Design Report (Site). Drawbridge purchased the South Parcel of the South Plant in August 2016 [USEPA, 2017b]. The Phase 2 parcel is bordered to the east by a sluiceway which conveys stormwater runoff from the North Parcel and North Plant. The sluiceway and the sediments in the riparian zone are to be addressed separately by Honeywell and Chemtrade. Currently all buildings have been demolished, however, some concrete slabs are present and other subsurface structures may also be present at the Site. A Site plan is shown in **Figure 2**.

Overall, the South Parcel contains ten solid waste management units (SWMU) and four Areas of Concern (AOC), of which the following six SWMU and two AOC are within the Phase 2 portion (the Site):

- SWMU 1 Former North Phosphoric Acid Pond;
- SWMU 2 South Phosphoric Acid Pond;
- SWMU 7 Effluent Clarifier;
- SWMU 26 South Waste Treatment Plant;

- SWMU 35 Former Hazardous Waste Storage Pad;
- AOC 2 Acid Spill Area; and
- AOC 14 Former Sulfuric Acid Storage Tank Area Sump.

Constituents of concern (COC) in soil at the Site include metals, notably arsenic and lead, and the polycyclic aromatic hydrocarbon benzo[a]pyrene at depths ranging from approximately 0 to 7 feet below ground surface (bgs). Historical results also indicate that there are metals in groundwater, and pesticides in soil and groundwater [Woodard & Curran, 2016].

2.2 Remedy Description

The selected remedy for the 22-acre Site (the South Parcel) is a combination of engineering and institutional controls outlined in the Statement of Basis (SB) [USEPA, 2016a] and the Final Decision and Response to Comments (FDRTC) [USEPA, 2016b] and addresses the following Corrective Action Objectives (CAOs) for soil and groundwater:

Soil: *“Prevent all uncontrolled human exposure to contaminated soils that exceed the industrial RSLs and minimize cross-media transfer of contaminants of concern (COCs) from soil to groundwater and surface water to minimize the impact to ecological receptors.”* [USEPA, 2016a]

Groundwater: *“While this SB does not include a proposed remedy for groundwater and because contaminants remain in the groundwater at the South Parcel, EPA is including a proposed corrective action objective for groundwater to prevent any other unacceptable exposures to impacted groundwater and ensure that groundwater containing elevated concentrations of COCs will not impact ecological receptors nor adjacent surface water bodies.”* [USEPA, 2016a]

Groundwater is only being considered here as it relates to future controls to protect against unacceptable cross-media migration. Honeywell International Inc. (Honeywell) is legally responsible for groundwater at the South Plant.

As detailed in the USEPA SB and FDRTC, the selected remedy for the South Parcel is as follows:

The proposed remedy for the South Parcel soils is to install and maintain a low permeability cap that controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post remedial action escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere. In addition, the cap shall be designed and constructed to prevent infiltration to mitigate potential cross-media migration (soil to groundwater) of COCs. This cap shall be functionally equivalent to the performance standards documented in 40 CFR Section 265.310.” [USEPA, 2016a].

The South Parcel Phase 1 capping was constructed in 2017 and redeveloped as a rail yard. The Phase 2 capping will integrate with the adjacent capping system beneath the rail yard, as well as with the sluiceway, and the shoreline.

The proposed Phase 2 Capping System cross section includes the following components, from top to bottom:

- 12-inch thick drainage and protection layer;
- A minimum ¼-inch thick geosynthetic clay liner (GCL) layer; and
- Re-graded and compacted existing material.

The cap will be overlain by a cover layer that may consist of asphalt, gravel, concrete, vegetative cover, or other surface that will be selected to be consistent with the future use of the property.

In addition to the low permeability cap, the final remedy for the South Parcel includes the following institutional controls and land and groundwater use restrictions:

- The Site will be restricted to commercial and/or industrial use.
- Groundwater will not be used for any purpose other than to conduct the operation, maintenance and monitoring required by Delaware Department of Natural Resources and Environmental Control (DNREC) and/or USEPA.
- Earth moving activities, including excavation, drilling, and construction activities in the area of the South Parcel, where any contaminants remain in soils above state, local, or USEPA Region 3 screening levels for industrial soils or in groundwater above their state or local Maximum Contaminant Levels (MCLs) or USEPA health-based screening levels for tap water will be conducted in compliance with the Materials Management Plan (MMP).
- Monitoring, maintenance, and inspections of the cap will be conducted in accordance with the CMP.

2. REMEDIAL DESIGN

The South Parcel Phase 2 cap will integrate with the adjacent capping system constructed beneath Phase 1 (the railyard), as well as anticipated future corrective actions for the sluiceway and the shoreline. The Phase 2 remedy includes construction of a low-permeability cap consisting of a GCL overlain by a drainage layer to minimize infiltration of rainwater to the underlying impacted soil.

Only the Phase 2 design components are addressed in this CMP.

2.3 Cap System Components

The proposed Phase 2 Capping System cross section includes the following components, from top to bottom:

- 12-inch thick drainage layer;
- A minimum ¼-inch thick GCL layer; and
- Re-graded and compacted existing material.

The cap will be overlain by a cover layer that may consist of asphalt, gravel, concrete, vegetative cover, or other surface that will be selected to be consistent with the future use of the property.

2.4 Construction Overview

Construction activities will include:

- breaking up existing concrete slabs to a minimum of 12 inches below grade;
- crushing and consolidation of existing debris piles;
- grading of stabilized material to promote drainage; and
- construction of the geosynthetic cap system including the GCL and the drainage and protection layer.

3. SITE MAINTENANCE

2.5 General Maintenance

Site maintenance covers the routine inspection and upkeep of all major Site components during a post-closure care period. Routine inspections will be performed quarterly based on the general condition of Site features and maintenance history.

All records (i.e., inspection reports and maintenance repair summaries) will be submitted electronically to the USEPA and DNREC Solid and Hazardous Waste Management Section (SHWMS) as discussed in Section 6.0.

2.6 Maintenance and Repair of the Cap System

The cap system is a multilayer system consisting of natural and synthetic materials. Careful routine inspections will be necessary to assess the condition of the underlying layers.

Any signs of erosion, settlement cracking, or other Site maintenance problems identified during Site inspections will be corrected as soon as possible. A qualified reviewer shall perform the following:

- Determine the nature and extent of the problem;
- Identify the cause of the problem;
- Determine the remedial measures necessary to repair the problem;
- Schedule repair; and
- Observe and document repair.

2.6.1 Erosion Rills

Should erosion be observed, it will be filled, restoring the cap system to the original lines as shown on the project design documents. Materials shall conform and be installed as per the original project design documents.

2.6.2 Settlement

A qualified reviewer will evaluate areas of settlement on a case-by-case. Where settlement is evident enough to allow ponding of surface water or concentrated flows, the area will be repaired by placing additional cover material to lines and grades, allowing for positive drainage. Materials and methods used to place such material shall adhere to the project design documents.

2.6.3 Geosynthetic Component Repairs

Repair to damaged GCL will first require the damaged area to carefully be exposed to reveal the entire extent of the damage. The geosynthetic materials will be cleaned a minimum of 3 feet in each direction beyond the damaged area, allowing ample room for repairs.

Each component will be evaluated for the necessary repairs to be made. All repair materials, workmanship, and quality control will be as described in the original project design documents for each of the geosynthetic components. Re-certification will be provided to USEPA and DNREC to ensure repairs were made in accordance with the original specifications, by a certified professional installer, and that QA/QC measures for repair material and process were followed.

Following successful repair and inspection of the repairs to the geosynthetics, the drainage and protection layer and cover material shall be replaced using the approved materials and methods indicated in the design documents.

2.6.4 Vermin Control

Damage from burrowing animals to the cap is not anticipated; however, the cap system will be inspected for burrows during the prescribed inspections. Damage caused by burrowing animals will be repaired by filling the hole with approved cover material, regrading the surface, and restoring the cover surface. The depth of the burrow will be evaluated prior to repair to determine if the underlying geosynthetic materials have been impacted. If necessary, removal of burrowing animals may be accomplished using a licensed pest removal contractor.

2.7 Maintenance to Erosion Control and Drainage Structures

All erosion control structures, such as perimeter channels and outlets, are included in the maintenance work. Each structure will be inspected for irregularities such as displaced channel protection (rip-rap), eroded areas, sediment build-up, or scouring and settlement.

Periodic cleaning and removal of sediment and debris from the drainage structures may be required, especially during the initial stages of the Site development. Continuous impact to the structures will be evaluated to determine if additional measures, such as energy dissipaters or larger rip-rap slope protection, are needed.

4. ENVIRONMENTAL MONITORING

USEPA will issue a separate SB addressing the groundwater at the South Plant after the groundwater is evaluated further under the RCRA Corrective Action Program. Therefore, the groundwater and surface water monitoring programs are currently not a part of the CMP and will be addressed at a later date under separate cover.

5. RECORDKEEPING

A quarterly inspection of the capping system surface, the drainage conveyance and other areas of the Site will be conducted. Maintenance and monitoring records will be maintained throughout the post-closure period. All field procedures will be observed and documented in field logs. A Site inspection checklist is included as **Table 1**. A copy of the Site plan will be included with the Site inspection checklist to document locations of any problem areas requiring maintenance.

2.8 Regulatory Reporting Requirements

A Corrective Measures Implementation (CMI) Report will be submitted to USEPA within ninety (90) calendar days of completing the construction of the Phase 2 remedy. The CMI Report for Phase 2 construction will describe activities performed during construction, provide actual specifications of the implemented remedy, and provide a preliminary assessment of remedy performance.

A CMI Assessment Report will be prepared for the Phase 2 remedy within one year after USEPA approval of a CMI Design Reports for Phase 2 remedy. The reports will contain data documenting that the post-closure performance standards have been achieved. The certification reports will include an evaluation of any remaining potential risks and justification for whether or not any further corrective action should be pursued. The reports will include summaries of field data such as inspection reports, summarized daily logs, and sample collection logs. The field data will be provided in field forms that will be submitted to DNREC and USEPA in annual progress reports.

2.9 Five-Year Remedy Evaluation

A CMI Five-Year Assessment Report will be prepared and submitted to USEPA for the final remedy as detailed in Final Decision and Response to Comments (USEPA, 2016b) no later than five years after the effective date of the Consent Order (USEPA, 2016c) and every five years thereafter. The report will contain data documenting that the post-closure performance standards have been achieved. The report will also include an evaluation of any remaining potential risks and justification describing whether or not any further corrective action should be pursued.

6. PERSONNEL HEALTH AND SAFETY

Personnel inspecting, repairing, or conducting other on-Site activities related to cap maintenance will be trained in the relevant health and safety systems and procedures for the work they are conducting. On-Site employees and subcontractors will receive Site-specific training regarding emergency procedures, on the job safety, and hazard communication (Right to Know). Monitoring and maintenance activities will be reviewed for potential safety hazards prior to field mobilization. Contractors will have experience with maintenance of multi-layered capping systems.

Site work will be in accordance with the specifications and requirements of a Site Health and Safety Plan (HASP). Personnel working at the Site will attend any required plant orientations and review the Site HASP prior to commencement of fieldwork. In addition, all personnel will attend morning safety meetings at the start of each workday. Equipment inspections will be performed as described in the HASP.

7. REFERENCES

- AECOM. 2017. RCRA Corrective Measures Implementation 100% Design Report Phase 1. Delaware Valley Works Facility South Parcel, USEPA ID No. DED154576698. Claymont, DE. April 2017, Revised August 2017.
- Geosyntec Consultants. 2020. Delaware Valley Works South Parcel, Phase 2, Pre-Design Investigation Report, prepared for Drawbridge Claymont, LLC. November 2020.
- Geosyntec Consultants. 2021. Delaware Valley Works South Parcel, Phase 2, 30% Design Report, prepared for Drawbridge Claymont, LLC. July 2021.
- DNREC. 2002. Operation and Maintenance Guidance Document for HSCA and VCP sites. February 2002.
- USEPA. 2016a. Statement of Basis. Chemtrade Solutions LLC (Formerly General Chemical Corp.), Delaware Valley Works Facility, EPA ID No. DED154576698, 6300 Philadelphia Pike, Claymont, DE. March 2016.
- USEPA. 2016b. Final Decision. Chemtrade Solutions LLC (Formerly General Chemical Corp.), Delaware Valley Works Facility, EPA ID No. DED154576698, 6300 Philadelphia Pike, Claymont, DE. May 2016.
- USEPA. 2016c. Consent Order. Chemtrade Solutions LLC (Formerly General Chemical Corp.), Delaware Valley Works Facility, EPA ID No. DED154576698, 6300 Philadelphia Pike, Claymont, DE. July 2016.

TABLES

Table 1: Inspection Checklist
Delaware Valley Works Facility South Parcel
Claymont, Delaware

Date: _____ Time: _____

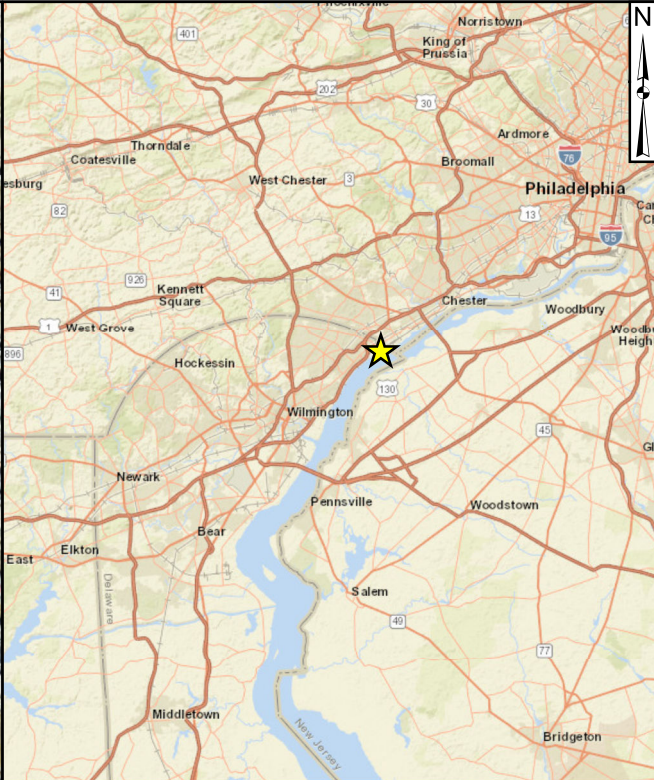
Inspected By: _____

This form is to be used for inspection of the cap surface. Please answer the provided questions as appropriate. For any question answered with a “yes”, provide a brief description of the observation, a recommendation for follow-up actions and a date for the follow-up to be completed. If follow-up actions are necessary, mark these locations on the Site map.

ENGINEERED CAP SYSTEM		
Yes	No	A1. Signs of structural deterioration? A2. Indications of accidental damage? A3. Subsidence? A4. Other observations?
CAP EROSION		
Yes	No	B1. Indications of significant erosion? B2. Other observations?
DRAINAGE CHANNELS		
Yes	No	C1. Significant sediment build-up? C2. Indication of significant erosion? C3. Other observations?

DRAINAGE PIPES AND OUTFALLS	
Yes No	D1. Sediment build-up? D2. Trash or other obstructions? D3. Other observations?
ACCESS ROADS	
Yes No	E1. Potholes or ruts? E2. Areas of settlement? E3. Damaged areas? E4. Other observations?
MONITORING WELLS AND SECURITY SYSTEM	
Yes No	F1. Is maintenance needed for the fence or electronic system? F2. Observed damage to wells or monitoring system since the last inspection? F3. Other observations?

FIGURES



- Legend**
- Facility Boundary**
- South Plant North Parcel
 - South Plant South Parcel - Phase 1
 - South Plant South Parcel - Phase 2 (Project Site)

0 500 Feet

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Site Location Map

Drawbridge Claymont, LLC
Delaware Valley Works Facility, South Plant
Claymont, Delaware

Geosyntec
consultants

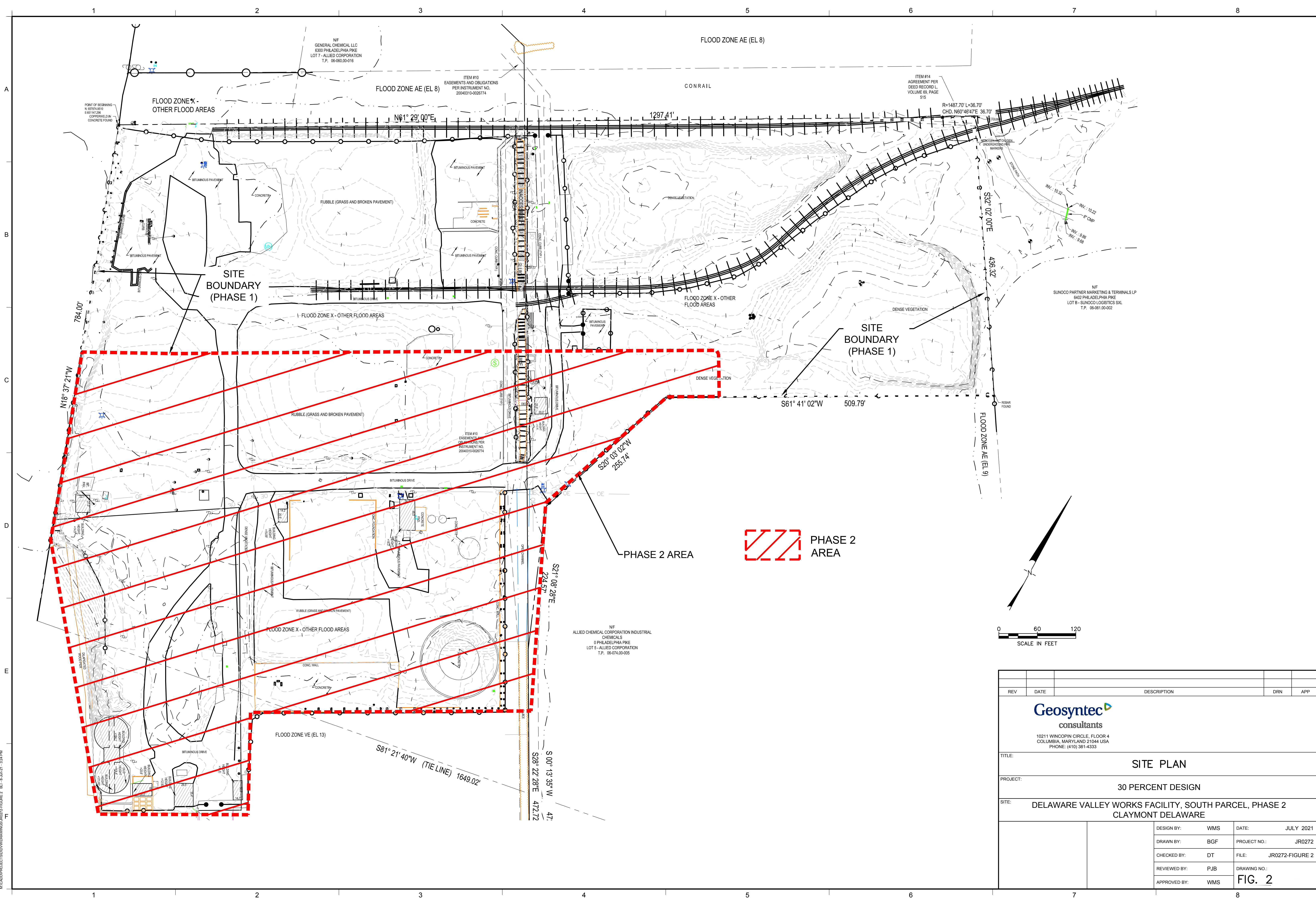
Pennington, New Jersey

July 2021

Figure

1

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APPENDIX C

MATERIALS MANAGEMENT PLAN

Prepared for
Drawbridge Claymont, LLC

34 East Germantown Pike #203
Norristown, Pennsylvania 19401

DELAWARE VALLEY WORKS FACILITY SOUTH PARCEL, PHASE 2 MATERIALS MANAGEMENT PLAN

Delaware Valley Works Facility
Claymont, Delaware

Prepared by

Geosyntec 
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engineers | scientists | innovators

1750 American Boulevard, Suite 200
Pennington, New Jersey 08534

Project Number: JR0272

July 2021

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FIGURES

Figure 1 Site Location Map

Figure 2 Site Plan

1. INTRODUCTION

This Materials Management Plan (MMP) has been prepared for the South Parcel Phase 2 cap at the Delaware Valley Works (DVW) facility (Site) in Claymont, Delaware. The Site location is shown in Figure 1. This MMP is prepared in accordance with the requirements of the Consent Order between the United States Environmental Protection Agency (USEPA) and Chemtrade Solutions LLC (formerly General Chemical Corp.), (USEPA, 2016c), Delaware's Regulations Governing Solid Waste (7 DE Admin. Code 1301), and Delaware's Regulations Governing Hazardous Waste (7 DE Admin. Code 1302).

This MMP is based on the CMP developed for the South Plant, South Parcel, Phase 1 cap by AECOM (2017) and has been modified to reflect the Phase 2 capping remedy.

1.1 Site Background

The DVW South Parcel Site is located along the Delaware – Pennsylvania border in an industrial area of New Castle County, Delaware, situated between Philadelphia Pike (Route 13) and the north shore of the Delaware River, approximately 0.2 miles west of the Pennsylvania State line. The Site and adjacent areas have been used for industrial purposes for more than 100 years. The Site location is shown on **Figure 1**.

Based on historical topographic maps from the United States Geologic Survey (USGS) from 1896 to 2016, the Site was undeveloped in the late 1800s and early 1900s. By 1941 the Site and adjacent properties were industrialized with several buildings and rail lines. Historic photos show bulk storage tanks are visible at the adjacent property to the west, as are the piers that border the Delaware River to the south both on-Site and to the west. Bulk storage tank is currently present adjacent to the west property boundary. A wet area has been constructed on the property east of the Site in the 1970s which appears to have been infilled and identified as a disposal site by 1993 and is mounded. The mound is visible in the 2016 topographic map. The 2011 to 2016 topographic maps illustrate a near-shore area that appears to be infilled sediments.

Historically, the Site comprised a chemical manufacturing facility straddling the Philadelphia Pike (Route 13). The North Plant facility is currently owned and operated by Honeywell. The South Plant is an inactive (demolished) chemical manufacturing facility formerly operated by General Chemical LLC which was acquired by Chemtrade in 2014. The DVW South Plant (including Phase 1 and Phase 2) is the subject of an Initial Administrative Order issued to General Chemical LLC which formerly operated the South Plant [AECOM, 2017a].

The South Plant was subdivided in 2016 into a North Parcel and South Parcel. The South Parcel is 22 acres in size plus 5 acres of nearshore riparian zone. The South Parcel was further divided into two remedial and development units – Phase 1 is approximately 13 acres and has already been capped and developed as a railcar storage yard, and Phase 2, approximately 9 acres, is the focus of this 30% Design Report. Drawbridge purchased the South Parcel of the South Plant in August 2016 [USEPA, 2017b]. The Phase 2 parcel is bordered to the east by a sluiceway which conveys stormwater runoff

from the North Parcel and North Plant. The sluiceway and the sediments in the riparian zone are to be addressed separately by Honeywell and Chemtrade. Currently all buildings have been demolished, however, some concrete slabs are present and other subsurface structures may also be present at the Site. A Site plan is shown in **Figure 2**.

Overall, the South Parcel contains ten solid waste management units (SWMU) and four Areas of Concern (AOC), of which the following six SWMU and two AOC are within the Phase 2 portion (the Site):

- SWMU 1 Former North Phosphoric Acid Pond;
- SWMU 2 South Phosphoric Acid Pond;
- SWMU 7 Effluent Clarifier;
- SWMU 26 South Waste Treatment Plant;
- SWMU 35 Former Hazardous Waste Storage Pad;
- AOC 2 Acid Spill Area; and
- AOC 14 Former Sulfuric Acid Storage Tank Area Sump.

Constituents of concern (COC) in soil at the Site include metals, notably arsenic and lead, and the polycyclic aromatic hydrocarbon benzo[a]pyrene at depths ranging from approximately 0 to 7 feet below ground surface (bgs). Historical results also indicate that there are metals in groundwater, and pesticides in soil and groundwater [Woodard & Curran, 2016].

As described in the RCRA Consent Order (USEPA, 2016c), the selected remedy for the Site is a combination of engineering and institutional controls. Based on the future development of the Site, the remedy will be accomplished in two phases. Phase 1 was the installation of low permeability cap for the railyard redevelopment portion of the South Parcel.

Phase 2 is the installation of low permeability cap for the remainder of the Site. In addition to the low permeability cap, the final remedy for the South Parcel includes the institutional controls and land and groundwater use restrictions. Details of the proposed remedy are presented in the 30% Design Report (Geosyntec Consultants, 2021), which includes a general description of the proposed remedial measures.

1.2 Objective

The objective of this document is to create a MMP in compliance with RCRA and the Consent Order. The remedial action capping for the Site has been designed to minimize excavation and disposal of solid waste. This MMP has been developed as a contingency should solid waste be generated necessitating characterization prior to disposal. Site redevelopment activities may result in the generation of solid waste, and potentially hazardous waste. This MMP provides a framework for

determining if the solid waste is a hazardous waste and provides field instruction for managing the solid waste until it is removed off-site for treatment and/or disposal.

1.3 Scope of Work

The MMP applies to the handling and disposal of soil encountered during the earthwork activities at the Site.

Potential site work that involves soil disturbance includes maintenance, soil removal actions, and remediation activities. Trenching, excavation, drilling, grading, or backfilling operations associated with these types of activities involve contact with surface and subsurface soil. In some cases, groundwater may be encountered. Soil management practices will be implemented where these activities create the potential for contact with impacted soil and/or groundwater.

The project design intent is to re-use/incorporate all suitable excavated soil and demolition debris materials into subgrade preparation. Excavated soil or other materials (e.g. rebar, wood) that cannot be made suitable for re-use (via crushing, moisture/strength-conditioning, etc.), and for which on-Site re-placement is not possible, will be staged and characterized as needed for off-site disposal as further described in the Section 6.

The following is a summary of work for remedial action (RA) construction activities to be conducted by Geosyntec and remediation contractors:

- Mobilize to the Site and install support facilities.
- Perform any required pre-construction surveys, records, and final surveys.
- Install work zone demarcation fencing, safety fencing, and traffic control devices.
- Clear the Site of shrubs and vegetation for off-site disposal.
- Install erosion protection, sediment controls, and surface-water controls.
- Construct low permeability cap.
- Perform final backfill and restoration activities.
- After restoration activities are completed, remove temporary erosion controls.

1.4 Hazardous Waste General Status

The Site is considered a Conditionally Exempt Small Quantity Generator (CESQG) of RCRA hazardous waste. The Site's USEPA generator identification number is DED154576698.

The generator status is based on the monthly generation totals.

1.5 Hazardous Waste Generator Requirements

1.5.1 Episodic Generation

Generators may periodically exceed their normal generation limits in any given calendar month. If the amount of waste generated in a given calendar month places the generator in a higher category, the generator is responsible for complying with all applicable requirements of that category for all waste generated during that calendar month. For example, if a generator produces 300 kilograms (kg) of hazardous waste in March, that waste must be managed in accordance with the small quantities generator (SQG) regulations; if the same generator produces 1,500 kg of hazardous waste in April, that waste must be managed in accordance with the large quantities generator (LQG) regulations (51 FR 10146, 10153; March 24, 1986).

As a general rule, any waste generated at a higher episodic generator status will be segregated from the routine lower generator status waste. Therefore, the Site will be responsible for managing only the episodic waste under the higher episodic generator status.

1.5.2 Large Quantity Generator (LQG)

The following general hazardous waste generator requirements are applicable for a LQG site along with any applicable Site procedures:

- USEPA and Delaware Department of Natural Resources and Control (DNREC) must be notified of any hazardous waste activity.
- Hazardous waste on-site is allowed to accumulate no longer than 90 days.
- There is no limit on the quantity of hazardous waste that can be accumulated on-site.
- Accumulation start date must appear on each waste container.
- As necessary, the words “Hazardous Waste” are required on each container.
- Containers of hazardous waste must be kept closed, except when hazardous waste is being added or removed.
- The container storage location must be at least 50 feet from property line.
- Hazardous waste treatment is allowed in accumulation units.
- A manifest must be used to ship hazardous waste off-site.
- Hazardous waste must be shipped using transporters and facilities that have USEPA ID numbers.
- The site must prepare land disposal restriction (LDR) notifications/certifications.
- The site must conduct personnel training.
- The site must have a preparedness and prevention plan on file at the Site.
- The Site must have a contingency plan that outlines site emergency procedures on file with local emergency responders.

- The site must prepare and file on-site all hazardous waste records.

The general hazardous waste generator requirements for an LQG are not limited to those listed above.

1.5.3 Small Quantity Generator (SQG)

The following general hazardous waste generator requirements are applicable for a SQG site along with any applicable Site procedures:

- USEPA and DNREC must be notified of any hazardous waste activity.
- Hazardous waste is allowed to accumulate on-site no longer than 180 days (270 days if waste is shipped more than 200 miles).
- Less than 6,000 kg of non-acute hazardous waste, 1 kg of acute hazardous waste, or 100 kg residue or contaminated soil from the cleanup of acute hazardous waste spill can be accumulated on-site.
- Accumulation start date must appear on each waste container.
- As necessary, the words “Hazardous Waste” are required on each container.
- Containers of hazardous waste must be kept closed, except when hazardous waste is being added or removed.
- Hazardous waste treatment is allowed in accumulation units.
- A manifest must be used to ship hazardous waste off-site.
- Hazardous waste must be shipped using transporters and facilities that have USEPA ID numbers.
- The site must prepare land disposal restriction (LDR) notifications/certifications.
- The site must conduct personnel training.
- The site must have emergency procedures.
- The site must prepare and file on-site all hazardous waste records.

The general hazardous waste generator requirements for an SQG are not limited to those listed above.

1.5.4 Conditionally Exempt Small Quantity Generator (CESQG)

The following general hazardous waste generator requirements are applicable for a CESQG site along with any applicable Site procedures:

- USEPA and DNREC must be notified of any hazardous waste activity.
- There is no limit to the on-site accumulation time for hazardous waste.
- Less than 1,000 kg of hazardous waste, 1 kg of acute hazardous waste, or 100 kg residue or contaminated soil from the cleanup of acute hazardous waste spill can be accumulated on-site.
- Accumulation start date must appear on each waste container.
- As necessary, the words “Hazardous Waste” are required on each container.

- The container storage location must be at least 50 feet from property line.
- Hazardous waste treatment is allowed on-site if the site meets one of the conditions listed in §261.5(g)(3)(iii-vii).
- A manifest is not required to ship hazardous waste off-site.
- Hazardous waste will be shipped using transporters and facilities that have USEPA ID numbers. There are limited exceptions to this requirement, but for all practical purposes, licensed transporters and facilities will be used.
- The site is not required to prepare LDR notifications/certifications.
- The site is not required to conduct personnel training.
- The site is not required to prepare and file all hazardous waste records on-site.

The general hazardous waste generator requirements for a CESQG are not limited to those listed above.

1.6 Purpose and Organization

The purpose of this MMP is to document USEPA and DNREC approved procedures for managing soil and groundwater during subsurface earth moving activities, including construction of cap, and Site redevelopment, when such activities are located in the following areas:

- Within SWMUs and areas of concern listed in SB
- Other areas of the Site
- Where contact with groundwater known to contain constituents of concern (COCs) above cleanup criteria will be required

The report is organized as follows:

- Section 2 describes soil management procedures.
- Section 3 describes groundwater management procedures.
- Section 4 describes stormwater management procedures.
- Section 5 describes construction debris management procedures.
- Section 6 provides waste management procedures.
- Section 7 provides waste handling procedures.
- Section 8 lists required supporting documents.
- Section 9 provides references.

2. SOIL MANAGEMENT

The major COC for off-site management are arsenic and lead, potentially at levels exceeding hazardous waste limits. Other COC to a lesser extent include benzo(a)pyrene. Focus should be to limit accumulation of excavated soil by minimizing the time for staging of soil on-Site through proper coordination and scheduling of Site activities. Site activities should be planned ahead so that only areas that are actively being developed are exposed.

2.1 Health and Safety

For all work at the Site, a daily Safety Task Analysis form will be completed for all activities. The daily Safety Task Analysis is maintained at each work location. Where activities involve excavation, in addition to the expected checks for buried utilities, the work permit must be approved by the Drawbridge superintendent, who will consider whether there is potential for contact with impacted soil.

2.2 Procedures

The potential presence of impacted soil will be considered in the planning stages of any soil disturbance work, and a work plan will be developed that mitigates risks associated with potential exposure pathways.

Before beginning earth-moving activities in areas with affected soil, Site controls will be established to protect remediation workers and Site visitors and to prevent the spread of potentially contaminated soil to unaffected portions of the Site or to off-site areas.

To prevent the potential spread of COC in soil if excavation becomes necessary in affected areas, each hazardous waste excavation area will be divided into a minimum of three separate work zones: the Exclusion Zone, the Contamination Reduction Zone (CRZ), and the Support Zone. The location of these zones will be established prior to excavation and may be relocated as work progresses and activities are completed in some areas and initiated in others. The zones are defined as follows:

- **Exclusion Zone:** Remediation activities will take place in this area. Personnel and equipment entering or leaving the exclusion zone will do so through the contamination reduction corridor(s) associated with the CRZ. Personnel will enter and exit the Exclusion Zone via this designated route and will wear the appropriate personal protective equipment (PPE), as specified in the Site HASP.
- **CRZ:** Decontamination of personnel and equipment will take place in this area. A specific location for ingress and egress from the support zone to the CRZ will be designated.
- **Support Zone:** This zone will be used for administrative and support activities and to store decontaminated equipment, vehicles, tools, and other equipment. This area will be designated as a clean area.

Prior to beginning excavation or drilling, it will be necessary to locate and protect all buried pipelines, electrical lines, telephone cables, water lines, gas mains, sewer lines, and subsurface utilities.

If it is necessary for personnel to enter the excavations for any purpose and the depth of excavation exceeds 4 feet, the sides will be sloped in accordance with Occupational Safety and Health Administration (OSHA) standards as required by the Code of Federal Regulations (CFR), Title 29, Part 1926. Excavations shall be inspected daily and after every rainstorm by a qualified professional, as defined by OSHA regulations, for evidence of possible instability.

With the exception of work on the sluiceway, no requirement for shoring of excavations is anticipated. However, if shoring of excavations becomes necessary due to unforeseen site conditions, it will be designed by a qualified person to meet accepted engineering requirements in accordance with OSHA standards as required by the Code of Federal Regulations, Title 29, Part 1926 prior to excavation or construction. All components of the shoring system will be removed upon completion of the work.

All rinsate from decontamination operations will be managed in accordance with procedures described in Sections 6 and 7 of the report.

2.3 Waste Storage, Characterization, and Disposal Methods

Excavated soil and demo debris materials that cannot be re-used for subgrade preparation will be sampled as necessary for characterization. The following best management practices (BMPs) will be used to minimize potential exposure to excavated soil:

- Stage soil in controlled access areas.
- Manage stockpiled soil with BMPs to minimize erosion by the elements. BMPs may include locating stockpiles away from low lying areas, soil roughening, perimeter sediment barriers, etc.
- Minimize the time for staging of soil on-Site through proper coordination and scheduling of Site activities and off-site transport.
- Minimize the potential for stormwater contact with staged soil through engineering controls and the selection of appropriate staging areas.

Waste profiles will be established at permitted hazardous or non-hazardous waste disposal facilities as appropriate, and waste will be properly manifested and transported to such facilities by licensed transporters. Characterization and disposal procedures are described in the Sections 6 and 7 of the report.

3. GROUNDWATER MANAGEMENT

The major COC is arsenic, potentially at levels exceeding hazardous waste limits. Other COC at lesser levels include chromium, benzene, and methyl ethyl ketone.

Focus should be to limit hazardous waste generation to less than 2,200 pounds a month (< large quantity generator). If it has to be generated, then on-Site treatment and discharge to Delaware River is preferred. Clean Water Act (CWA) management of the investigation derived waste (IDW) will limit the potential for increase in RCRA generator category.

This section presents procedures for management and handling of groundwater known to contain COCs above cleanup criteria if earth moving and/or construction and drilling require contact with groundwater.

3.1 Procedures

Groundwater is unlikely to be encountered during the remedial activities however it may be encountered during Site redevelopment.

Types of waste generated during these activities may include purge water, decontamination water, PPE, plastic sheeting, and plastic tubing. All waste generated during remediation activities will be disposed of as described in the Sections 6 and 7. A general summary of waste disposal methods is presented in Section 3.3.

3.2 Summary of Waste Disposal Methods

Purge water and decontamination water will be collected in 5-gallon buckets or carboys and transferred to 55-gallon metal drums in designated waste accumulation areas.

Drums will be open only when water is being added and will be securely closed at all other times.

Plastic sheeting, plastic tubing, and PPE will be placed into large garbage bags and then into boxes and deposited into trash dumpsters on-Site.

Off-site disposal will be at CWA permitted facilities. If water is determined to be characteristically hazardous, it will be shipped under manifest to a RCRA-permitted facility for treatment and disposal.

4. STORMWATER RUNOFF

In accordance with the General Permit for Stormwater Discharges Associated with Construction, this section includes soil stabilization requirements to minimize contact between stormwater runoff and soil.

Management of stormwater runoff during the disturbances of impacted soil will be in accordance with an Erosion and Sedimentation Control Plan, which will be prepared as part of the 100% remedial design. In addition to the Erosion and Sedimentation Control Plan, the following BMPs will be implemented:

- During construction, temporary diversion ditches, dikes, catch basins, or other drainage structures will be installed as necessary to prevent surface-water runoff from entering or leaving excavations, stockpile areas, or other areas that might contain potentially contaminated soil.
- As the work progresses, such drainage structures will be maintained, repaired, modified, or relocated to meet the changing site conditions.
- If stormwater runoff comes into contact with soil containing COC, the stormwater will be collected, characterized, and transported according to the procedures outlined in the Sections 5 and 6 of this report.

5. CONSTRUCTION DEBRIS

All miscellaneous non-hazardous debris generated during Site activities will be managed as indicated below.

5.1 General/Office Trash

All general/office trash will be placed into the trash container located adjacent to the office trailer at the Site.

5.2 Construction Debris

Trash and inert, immobile, and nontoxic industrial waste will be disposed of off-site at solid waste landfills. Construction debris typically falls into this category, pending waste verification sampling. Therefore, as necessary, a 20- or 30-cubic yard roll-off container will be maintained on-Site as needed for construction debris.

6. WASTE MANAGEMENT PROCEDURES

Listing codes will not apply to any waste generated from the Site. If soil or other waste streams that require off-site disposal are generated, they will be sampled to determine whether they contain constituents at concentrations above the RCRA characteristic limits. All waste will be profiled with a permitted Treatment, Storage, and Disposal Facility (TSDF) before off-site disposal.

Transporters will be required to carry appropriate Department of Transportation (DOT) licenses and certifications, as well as applicable state permits for all states through which waste must be transported.

The potential waste streams and correlating storage, classification, and labeling requirements are identified below.

Potential Waste Streams

Waste Stream	Proposed RCRA Classification	Anticipated Waste Characterization Testing	Container Requirements and Estimated Volume	Labeling Requirements	Anticipated Disposal Method
Soil					
Excavated soil, plastic, and PPE (0 to 6 inches below ground surface including root materials)	RCRA non-hazardous based on historical soil analysis	TCLP metals and waste acceptance analysis required by landfill	Place into on-site temporary stockpiles and live load.	Green non-hazardous label for non-hazardous Yellow hazardous waste label for hazardous material	To approved landfill for alternative daily cover To approved TSDF for treatment and disposal
Excavated soil, plastic, and PPE (> 6 inches below ground surface)	RCRA non-hazardous based on historical soil analysis	TCLP Metals and Waste acceptance analysis required by landfill	Place into on-site temporary stockpiles and live load.	Green non-hazardous label for non-hazardous Yellow hazardous waste label for hazardous material	To approved landfill for alternative daily cover To approved TSDF for treatment and disposal

Waste Stream	Proposed RCRA Classification	Anticipated Waste Characterization Testing	Container Requirements and Estimated Volume	Labeling Requirements	Anticipated Disposal Method
Groundwater					
Groundwater	RCRA non-hazardous	Waste acceptance analysis required by facility	Containerize into DOT-approved 55-gallon drum	Green non-hazardous label Yellow hazardous waste label for hazardous material	To approved facility or permitted discharge
Treatment system media (filter bags/residue/etc.)	RCRA non-hazardous based on historical soil analysis	TCLP metals and waste acceptance analysis required by landfill	Place into on-site temporary stockpiles and live load.	Green non-hazardous label for non-hazardous Yellow hazardous waste label for hazardous material	To approved landfill for alternative daily cover To approved TSDF for treatment and disposal
Stormwater Runoff					
Water with no contact with contaminated media	RCRA non-hazardous	None	None	None	None
Water in contact with contaminated media	RCRA non-hazardous	Waste acceptance analysis required by facility	Containerize into DOT-approved 55-gallon drum	Green non-hazardous label Yellow hazardous waste label for hazardous material	To approved facility or permitted discharge
Construction Debris					
Vegetation debris	RCRA non-hazardous	None	Place into the dumpster for off-site disposal	None	Disposal at municipal landfill by contractor
Concrete	RCRA non-hazardous based on historical analysis	Characterization for on-Site re-use totals (SVOCs, VOCs, metals, pest, herb), and PCB Aroclors	Cover on-Site per Remedial Action Plan	Green non-hazardous label for non-hazardous Yellow hazardous waste label for hazardous material	Can remain on-Site if contaminant concentrations less than health based standards Disposal at approved landfill

Waste Stream	Proposed RCRA Classification	Anticipated Waste Characterization Testing	Container Requirements and Estimated Volume	Labeling Requirements	Anticipated Disposal Method
Asphalt	RCRA non-hazardous	PCB analysis by SW 846 Method 8082	Cover on-Site OR Place into on-site temporary stockpiles.	Green non-hazardous label for non-hazardous Yellow TSCA waste label for PCB >50 PPM material	Can remain on-Site if covered by 4 feet of fill If free of PCBs, recycle If contains PCBs <50ppm, dispose at municipal landfill by contractor
Treated wood waste	RCRA non-hazardous	TCLP metals and waste acceptance analysis required by landfill	Place into on-site temporary stockpiles and live load.	Green non-hazardous label for non-hazardous Yellow hazardous waste label for hazardous material	To approved landfill To approved TSDF for treatment and disposal
Scrap metal	Exempt from RCRA	None	Stockpile for pickup by recovery contractor	None	Metals recycling
Contractor trash	Solid waste	None	On-Site trash dumpster	None	Disposal at approved landfill
PPE	RCRA non-hazardous (contained-in rule)	None	Place into opaque trash bag. Manage in same fashion as associated waste. If waste no impacted, place in trash dumpster.	Green non-hazardous label for non-hazardous Yellow hazardous waste label for hazardous material	Disposal at municipal landfill by contractor To approved TSDF for treatment and disposal
Decontamination water	RCRA non-hazardous (contained-in rule)	None	Containerize into DOT-approved 55-gallon drum.	Green non-hazardous label	To approved facility

6.1 Area of Contamination

The site will establish an Area of Contamination (AOC) with DNREC for management of wastes from Site remediation activities. An AOC is defined as a broad area of generally dispersed contamination originating from one or more substances located within the area. USEPA developed the AOC policy to facilitate remediation of RCRA sites. The AOC Policy equates an AOC to a RCRA landfill, and similar to a landfill, movement of hazardous waste within the AOC would not be considered land disposal and would not trigger the RCRA land disposal restrictions. The AOC policy further discusses the concept of placement, clarifying that placement does not occur when waste is consolidated within the AOC, when it is treated in situ, or when it is left in place. Placement does occur when wastes are moved from one AOC to another or when waste is actively managed within or outside the AOC and placed back on the land. The AOC Policy applies to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program, RCRA corrective action sites, cleanups under state law, and voluntary cleanups.

The limits of the AOC will be the property boundary, with the entire area being considered an AOC (see Figure 2).

The management rules for RCRA hazardous waste are summarized and contrasted with the requirements for an LQG as follows.

RCRA Requirement	LQG	AOC
Type of RCRA unit structure	Containers, Buildings, and Land based units	Land-based unit
Quantity limits	$\geq 1,000$ kg/month > 1 kg/month of acute hazardous waste > 100 kg/month of acute spill residue or soil Part 262 and §261.5(e)	No minimum threshold
On-Site accumulation quantity	No Limit	No Limit
Inspection requirement	Weekly inspection	Weekly inspection
Accumulation time limit	<90 Days	None
Storage requirements	Full compliance for management of tanks, containers, drip pads, or containment buildings §262.34(a)	None
Management activities	Storage, treatment	Storage, in-situ treatment, disposal
LDR compliance	Must meet LDR for disposal to the land	Not applicable within the AOC
On-Site treatment limitations	Permitted activities or allowable exceptions, such as elementary neutralization units, totally enclosed treatment units, or wastewater treatment units [40 CFR 270.1(c)(2) and 40 CFR 262.34]	In-situ treatment or ex-situ processing (but not in a separate unit) do not constitute placement on the land

Container types allowed for storage	No restrictions	Drums only
Movement on-Site limitations	None	Placement does occur, and additional RCRA requirements may be triggered, when wastes are moved from one AOC to another (e.g., for consolidation) or when waste is actively managed (e.g., treated ex situ) within or outside the AOC and returned to the land.

7. WASTE HANDLING PROCEDURES

7.1 Waste Container Inventory Documentation

At the conclusion of the field event, a Waste Inventory should be prepared. The Waste Inventory should, include volumes, generation date, waste classification, and waste disposal location.

7.2 Container Labeling Instructions

Commercial labels for applicable wastes (non-hazardous, construction and demolition, etc.) will be completed in permanent marker. Accumulation start date should be indicated for all wastes on the label.

During on-Site accumulation, drummed waste must have one label affixed to the top 1/3 of each drum and clearly visible.

Roll-offs used for shipment off-site must comply with DOT rules. Per DOT rules, roll-off boxes that contain hazardous waste will require one label per side (four total) before offering the roll-off box for shipment. RCRA non-hazardous wastes need only one label indicating non-hazardous waste for shipment and hazard communication purposes.

7.3 Container Covering Requirements

All roll-off boxes will be equipped with tarps. Tarps must be securely strapped down on all roll-off boxes except during placement and/or removal of waste from the box. The tarps are equipped with black rubber straps, which must be secured before leaving the site or offering the roll-off box for over the road shipment.

Under the same requirements, drum lids must be securely closed after filling. Per DOT requirements, lids must fit tightly, and closure bolts must be securely tightened before offering the drum for shipment.

7.4 Container Accumulation Time Limits and Inspection Requirements

Waste Type	Generator Status	Accumulation Time Limit	Inspection Requirement
RCRA Non-Hazardous	Not Applicable	1 Year	Initial inventory and as added
RCRA Hazardous	Conditionally Exempt Small Quantity Generator	NA	Inventory weekly
RCRA Hazardous	Small Quantity Generator	180 days or 270 days (if transporting greater than 200 miles)	Inventory and inspect weekly
RCRA Hazardous	Large Quantity Generator	90 Days	Inventory and inspect weekly

The accumulation start date is the date waste was first placed in the storage container (e.g., drum, roll-off box, or tank).

Waste containers may be stored in a designated waste accumulation area until characterization is completed and may remain in this area until shipment.

7.5 Temporary Stockpiles for RCRA Non-Regulated Wastes

To the extent that it is necessary to stockpile wastes, all tested RCRA non-regulated waste will be stockpiled in locations where potential impact to underlying materials is minimized. Site personnel may use temporary stockpiles until roll-off box containers are available or material can be direct loaded into end dump trucks. These stockpiles will be covered to control stormwater runoff from the pile during rainfall events.

The stockpiles will be inspected at the close of each working day to make sure that they are covered. The stockpiles will be directly loaded for disposal as soon as practicable after selection of the disposal facility, profiling, and contracting are completed.

7.6 Temporary Stockpiles for RCRA Regulated Wastes

Based on the project scope, some excavation activities may require potentially hazardous waste material to be temporarily stockpiled within the AOC boundary. Site personnel may use temporary stockpiles until roll-off box containers are available or material can be direct loaded into end dump trailers. The stockpiles must be within the AOC boundary, and the piles must be covered and managed to prevent stormwater run-off out of the AOC. Stockpiles, covers, and any impacted soil below the piles must be removed from the site within 180 days after excavation if not within the boundary of an AOC.

The regulatory guidance addressing use of stockpiles to consolidate and stage waste within an AOC is found in *Management of Remediation Waste Under RCRA* (USEPA, 1998). This guidance states, “Because an AOC is a land-based unit, consolidation and or in-situ treatment of hazardous waste within the AOC does not create a new point of waste generation for the purposes of RCRA.” This interpretation allows wastes to be consolidated within an AOC without triggering land disposal restrictions.

8. SUPPORTING DOCUMENTS

In accordance with the Consent Order, requirements of this MMP include several supporting documents, as listed in the follow table.

Requirement	Location
Health and Safety Plan	To be developed prior to cap construction field activities
Quality Assurance Project Plan, Data Quality Objectives, and Data Management Plan	Not Applicable
Field Sampling Plan	Not Applicable

9. REFERENCES

7 Del. C § 1301 (November, 2014). Delaware's Regulations Governing Solid Waste.

7 Del. C § 1302 (November, 2014). Delaware's Regulations Governing Hazardous Waste.

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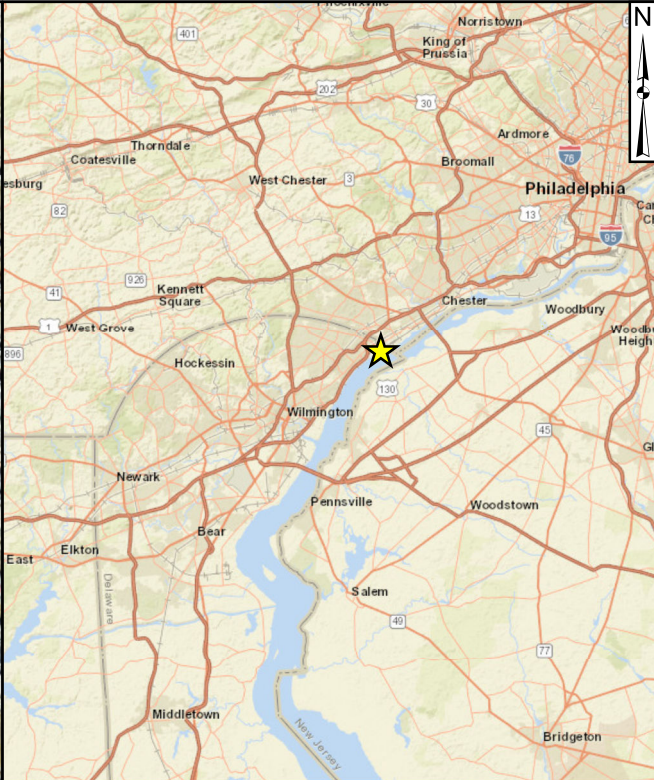
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FIGURES



- Legend**
- Facility Boundary**
- South Plant North Parcel
 - South Plant South Parcel - Phase 1
 - South Plant South Parcel - Phase 2 (Project Site)

0 500 Feet

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Site Location Map

Drawbridge Claymont, LLC
Delaware Valley Works Facility, South Plant
Claymont, Delaware

Geosyntec
consultants

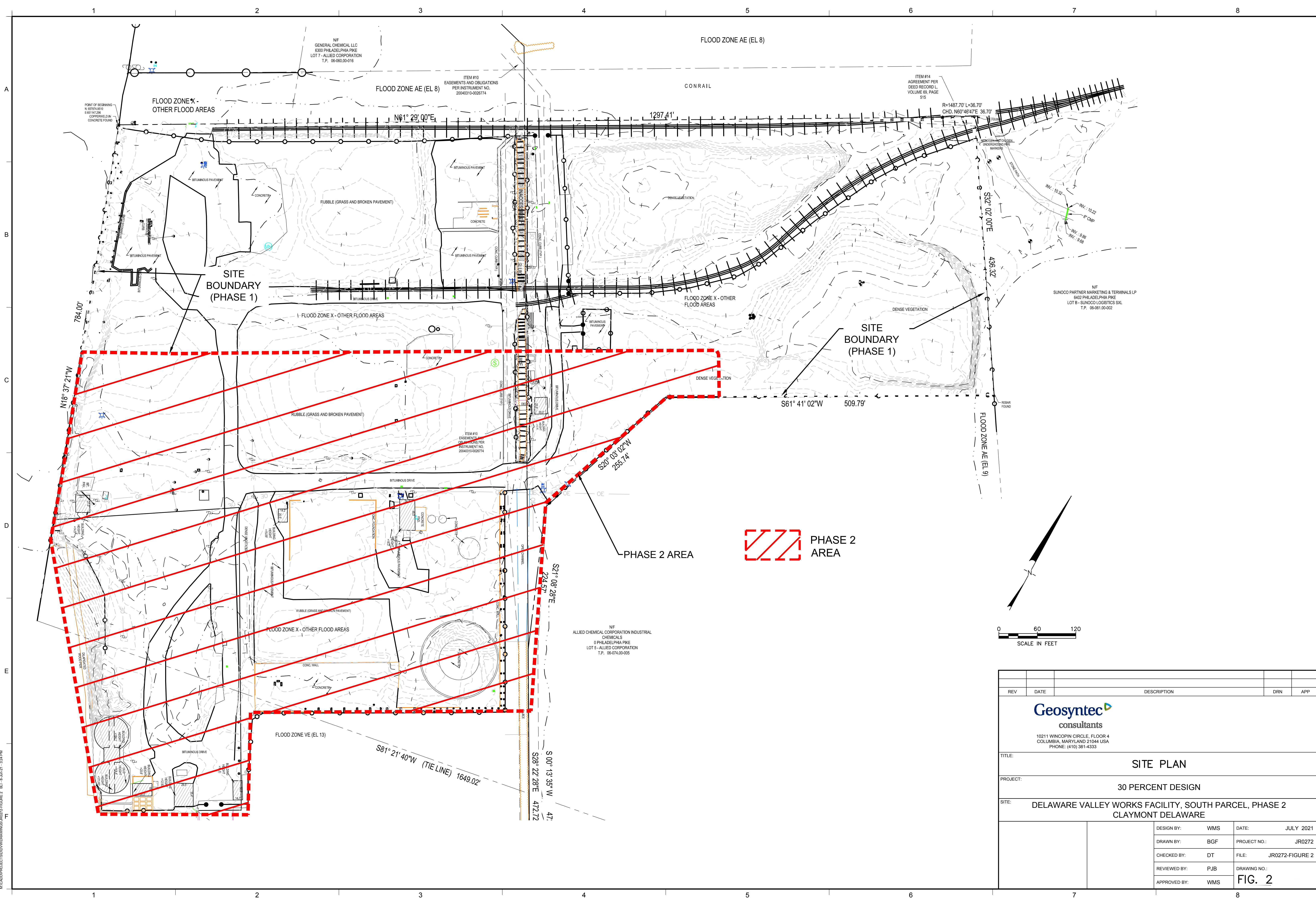
Pennington, New Jersey

July 2021

Figure

1

M:\CADD\PROJECTS\DRAWINGS\JR0272-FIGURE 2 - BLI - 14-Jun-21 - 3:24 PM



APPENDIX D

PROPOSED SCHEDULE FOR REMEDY DESIGN AND CONSTRUCTION

